

AMENDMENTS TO THE CLAIMS

Please amend claims 1, 11, 15, and 17 as follows.

Please cancel claim 12 without prejudice.

Please add new claims 27-29.

1. (Currently amended) A method, comprising:

lithographically patterning ~~a corner~~ an optical waveguide pathway over a material, the optical waveguide pathway including a first branch, a second branch, and a corner where the first branch intersects the second branch;

anisotropically etching portions of the material based on the lithographic pattern to obtain a region of the material that defines the corner; and

isotropically etching additional portions of the material from the region of the material to sharpen the corner.

2. (Cancelled)

3. (Original) The method of claim 1 wherein lithographically patterning the corner includes applying a photoresist material.

- 3 ~~4~~ (Original) The method of claim ~~3~~², further comprising removing the photoresist material from selected areas prior to sharpening the corner.

5. (Cancelled)

- ⁵ ~~6~~ (Original) The method of claim 1 wherein the material comprises a first material, the method further comprising:

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placing a second material in the region; and
removing excess second material from areas outside of the region.

6 ~~7~~. (Original) The method of claim ~~6~~⁵ wherein removing excess second material comprises using a chemical-mechanical polishing technique.

7 ~~8~~. (Original) The method of claim ~~6~~⁵, further comprising placing a third material over the second material.

8 ~~9~~. (Original) The method of claim ~~8~~⁷ wherein placing the third material over the second material and placing the second material in the region comprises using a deposition technique.

9 ~~10~~. (Original) The method of claim ~~8~~⁷ wherein the first and third materials comprise cladding material, and wherein the second material comprises core material.

10 ~~11~~. (Currently amended) The method of claim 1 wherein the first branch, the second branch, and the corner comprises comprise part of a Y-branch of an optical waveguide of an integrated optical device.

12. (Cancelled)

11 ~~13~~. (Original) The method of claim 1 wherein the corner comprises part of one of a microelectromechanical structure (MEMS) device, a photonic crystal device, or a photonic bandgap device.

¹² ~~14.~~ (Original) The method of claim 1, further comprising monitoring the removal of the portions of the material adjacent to the region if sufficient time has elapsed to sharpen the corner.

¹³ ~~15.~~ (Currently amended) The method of claim ~~14~~¹² wherein monitoring the removal of the portions of the material adjacent to the region comprises:

forming a diffraction grating having pillars of a substantially same radius as the corner to be sharpened, wherein the corner is rounded;

illuminating the pillars with a light and detecting light diffracted from the pillars;

~~removing~~ isotropically etching the pillars concurrently with isotropically etching additional portions of the material from the region of the material ~~removing portions of the material adjacent to the region~~; and

determining if sufficient time has elapsed to sharpen the corner based on the detected light diffracted from the pillars as they are ~~removed~~ isotropically etched.

⁴ ~~16.~~ (Original) The method of claim ~~3~~² wherein the corner is sharpened while the photoresist is in place.

¹⁴ ~~17.~~ (Currently amended) A method, comprising:

lithographically patterning a Y-branch optical waveguide pathway over a cladding material deposited on a substrate, the Y-branch optical waveguide pathway including a corner where a first branch of the Y-branch optical waveguide pathway splits into a second branch and a third branch of the Y-branch optical waveguide pathway;

~~lithographically patterning a corner over a cladding material deposited on a substrate;~~
based on the lithographic pattern, vertically etching the cladding material to
selectively remove portions of the cladding material to ~~define form~~ form a rounded corner in the
cladding material based on the corner of the Y-branch optical waveguide pathway; and
isotropically etching the cladding material to selectively remove additional portions
of the cladding material at the rounded corner to sharpen the rounded corner.

15 ~~18.~~ (Original) The method of claim ~~17~~¹⁴, further comprising depositing a core material in a
trench, adjacent to the sharpened corner, which was formed by the vertical etching and by the
isotropic etching.

16 ~~19.~~ (Original) The method of claim ~~18~~¹⁵, further comprising depositing another cladding
material over the core material, subsequent to a chemical-mechanical polish process to
remove excess core material deposited outside of the trench.

17 ~~20.~~ (Original) The method of claim ~~17~~¹⁴, further comprising:
forming pillars concurrently with the vertical etching of the cladding material, the
pillars having a dimension comparable to that of the rounded corner; and
isotropically etching the pillars concurrently with the rounded corner to determine
completion of the sharpening based on light diffracted from the pillars.

18 ~~21.~~ (Original) The method of claim ~~17~~¹⁴ wherein lithographically patterning the corner
includes using a photoresist.

Claims 22-26 (Cancelled).

¹⁹ ~~27.~~ (New) A method, comprising:
lithographically patterning a corner over a cladding material deposited on a substrate;
based on the lithographic pattern, vertically etching the cladding material to
selectively remove portions of the cladding material to define a rounded corner;
isotropically etching the cladding material to selectively remove additional portions
of the cladding material at the rounded corner to sharpen the rounded corner;
forming pillars concurrently with the vertical etching of the cladding material, the
pillars having a dimension comparable to that of the rounded corner; and
isotropically etching the pillars concurrently with the rounded corner to determine
completion of the sharpening based on light diffracted from the pillars.

¹⁹ ~~28.~~ (New) The method of claim ~~27~~¹⁹ wherein the corner comprises a portion of a Y-branch
of an optical waveguide.

¹⁹ ~~29.~~ (New) The method of claim ~~27~~¹⁹, further comprising:
depositing a core material in a trench, adjacent to the sharpened corner, which was
formed by the vertical etching and by the isotropic etching; and
depositing another cladding material over the core material, subsequent to a chemical-
mechanical polish process to remove excess core material deposited outside of the trench.